

**WHAT IS CLAIMED IS:**

- 1        1.        An apparatus comprising:  
2                a substrate; and  
3                a carbon nanotube layer deposited on the substrate, the carbon nanotube layer  
4                including an alkali material.
  
- 1        2.        The apparatus as recited in claim 1, wherein the alkali material is deposited as a layer  
2                onto the carbon nanotube layer.
  
- 1        3.        The apparatus as recited in claim 1, wherein the alkali material is doped into the  
2                carbon nanotube layer.
  
- 1        4.        The apparatus as recited in claim 1, wherein the alkali material is intercalated with  
2                the carbon nanotube layer.

1 5. An apparatus comprising:  
2 a substrate; and  
3 a carbon nanotube layer deposited on the substrate, the carbon nanotube layer  
4 including a separate low work function material.

1 6. The apparatus as recited in claim 1, wherein the low work function material is  
2 deposited as a layer onto the carbon nanotube layer.

1 7. The apparatus as recited in claim 1, wherein the low work function material is doped  
2 into the carbon nanotube layer.

1 8. The apparatus as recited in claim 1, wherein the low work function material is  
2 intercalated with the carbon nanotube layer.

1 9. The apparatus as recited in claim 1, wherein the low work function material is an  
2 alkali material.

1 10. A field emission apparatus comprising:  
2 a cathode comprising:  
3 a substrate; and  
4 a carbon nanotube layer deposited on the substrate, the carbon nanotube layer  
5 including an alkali material.

1 11. The apparatus as recited in claim 10, wherein the alkali material is deposited as a  
2 layer onto the carbon nanotube layer.

1 12. The apparatus as recited in claim 10, wherein the alkali material is doped into the  
2 carbon nanotube layer.

1 13. The apparatus as recited in claim 10, wherein the alkali material is intercalated with  
2 the carbon nanotube layer.

1 14. The apparatus as recited in claim 10, further comprising a conductive layer deposited  
2 between the substrate and the carbon nanotube layer.

1 15. A method for making a field emission cathode comprising the steps of:  
2 providing a substrate;  
3 depositing a carbon nanotube layer on the substrate; and  
4 inserting an alkali material into the carbon nanotube layer.

1 16. The method as recited in claim 15, wherein the inserting step further comprises the  
2 step of:  
3 depositing a layer of the alkali material on the carbon nanotube layer.

1 17. The method as recited in claim 15, wherein the inserting step further comprises the  
2 step of:  
3 doping the carbon nanotube layer with the alkali material.

1 18. The method as recited in claim 15, wherein the inserting step further comprises the  
2 step of:  
3 intercalating the alkali material into the carbon nanotube layer.